

American River Water Agencies

Modified Flow Management Standard

Proposed Water-Right Terms and Conditions

1. End-of-December carryover storage

Permittee shall maintain at least 300,000 acre-feet of water in storage in Folsom Reservoir on December 31 of all years, except: (A) Conference Years, as defined in this order; (B) Multiple Severe Dry Years, as defined in this order; and (C) years in which Permittee makes releases from Nimbus Dam to the lower American River between June 1 and December 31 only to meet American River Needs, as defined in this order. Permittee shall maintain at 230,000 acre-feet of water in storage in Folsom Reservoir on December 31 in all years. In years when Permittee may maintain 230,000 acre-feet of water in storage in Folsom Reservoir on December 31, Permittee shall use its best efforts to maintain December 31 storage as close as possible to 300,000 acre-feet and shall report those efforts to the Deputy Director for Water Rights and the Water Forum by the 15th day of each month during those years. Permittee shall not reduce water-supply allocations or deliveries that are diverted from Folsom Reservoir or the lower American River in order to comply with this term's minimum storage requirements.

2. Conference Year

For purposes of this order, a "Conference Year" is any calendar year during which the forecasted March through November unimpaired inflow to Folsom Reservoir is less than 400,000 acre-feet. The March through November unimpaired inflow shall be computed as the sum of the March 1-September 30 inflow to Folsom Reservoir (using the 50% exceedance forecast in the Department of Water Resources' (DWR) Bulletin 120), and 60,000 acre-feet. The 60,000-acre-feet factor represents an estimate of dry-year inflows to Folsom Reservoir from October 1 through November 30. Permittee shall reassess whether a year is a Conference Year within five days of DWR's release of each monthly update of Bulletin 120 during a year. Permittee shall report each of its calculations of whether a year is a Conference Year to the Deputy Director for Water Rights and the Water Forum.

3. Multiple Severe Dry Years

For purposes of this order, "Multiple Severe Dry Years" are two-year or three-year cycles of consecutive very dry years, as defined in this paragraph. To be "Multiple Severe Dry Years" under this order, a two-year cycle of consecutive

calendar years must involve a sum of the following two factors that is equal to or less than 1,200,000 acre-feet: (A) the calculated March-November unimpaired inflow to Folsom Reservoir in the first year; and (B) a projection of the current year's forecasted unimpaired inflow to Folsom Reservoir. To be "Multiple Severe Dry Years" under this order, a three-year cycle of consecutive calendar years must involve a sum of the following two factors that is equal to or less than 2,700,000 acre-feet: (i) the calculated March-November unimpaired inflow to Folsom Reservoir in the first and second years; and (ii) a projection of the current year's forecasted unimpaired inflow to Folsom Reservoir. To project the current year's forecasted unimpaired inflow to Folsom Reservoir, Permittee shall calculate the sum of 60,000 acre-feet and the forecasted March-September unimpaired inflow to Folsom Reservoir during that year, using the 50% exceedance forecast of March 1-September 30 inflow to Folsom Reservoir in DWR's Bulletin 120.

Permittee shall reassess whether a cycle of years are Multiple Severe Dry Years within five days of DWR's release of each monthly update of Bulletin 120 during a year. Permittee shall report each of its calculations of whether a cycle of years are Multiple Severe Dry Years to the Deputy Director for Water Rights and the Water Forum.

4. American River Needs

For purposes of this order, "American River Needs" are: (A) the Minimum Release Requirements, as they may be adjusted by the Redd Dewatering Protection Adjustment; (B) water-supply diversions from the lower American River below Nimbus Dam; and (C) minimum streamflows at the mouth of the American River as required by Decision 893.

5. Sacramento River Index

For purposes of this order, the term "Sacramento River Index" means the 75% exceedance level of the Sacramento River hydrologic index released by the Department of Water Resources on or about January 1 of each water year and that is based on the forecasted unimpaired inflow for the water year of the Sacramento River above Bend Bridge, the Feather River at Oroville, the Yuba River near Smartville and the American River below Folsom Reservoir.

6. American River Index

For purposes of this order, the term "American River Index" means the monthly calculation of projected unimpaired inflow to Folsom Reservoir minus spill from the reservoir during the relevant water year, as defined in more detail in Exhibit A. Under this order, Permittee will calculate the

American River Index in February, March, April and May of each water year within five days of the Department of Water Resources' release of each monthly update of Bulletin 120, subject to any refinements following the May release of Bulletin 120. Permittee shall promptly notify the Deputy Director for Water Rights and the Lower American River Group of its calculations of the American River Index.

7. End-of-May Storage Requirement

Permittee shall maintain in storage in Folsom Reservoir as of May 31 of each year an amount of water at least equal to the result of the following equations:

If the ARI is greater than 2,200,000 acre-feet, then required end-of-May storage is 900,000 acre-feet.

If the ARI is less than or equal to 2,200,000 acre-feet, then required end-of-May storage equals the product of 0.41 times the ARI.

8. Minimum Release Requirements (MRR)

Between January 1 and May 31, Permittee shall release, at a minimum, from Nimbus Dam to the lower American River water at the MRR indicated by the formulae stated in Exhibit B: (A) unless a higher minimum release during the applicable month is required by a Redd Dewatering Protective Adjustment, as defined in this order; and (B) except that the MRR for January shall not be higher than the MRR for December. Between June 1 and December 31, Permittee shall release, at a minimum, from Nimbus Dam to the lower American River water at the MRR indicated by the formulae stated in Exhibit B.

9. Redd Dewatering Protection Adjustments to MRRs

A. Adjustment for January – Protection of Fall-Run Chinook Salmon Redds

To protect fall-run Chinook salmon redds that have been set during November and December, the January MRR shall be adjusted pursuant to this term. During January, Permittee shall operate to an MRR as determined under Table 1 if that MRR is higher than the MRR that would be indicated under the formulae in Exhibit B based on the SRI.

Table 1. January MRR based on fall-run Chinook salmon redd protection.

<i>MRR_{Dec}</i> (cfs)	<i>If the December MRR was as indicated in this table and the reduction from the preceding December MRR to the January MRR allowed under the formulae in Exhibit B is:</i>						
	0-450	451-600	601-750	751-900	901-1,050	1,051-1,150	>1,150
	<i>Then, rather than the January MRR indicated in the formulae in Exhibit B, the allowable January MRR (cfs) is:</i>						
<=600	500	NA	NA	NA	NA	NA	NA
700	518	NA	NA	NA	NA	NA	NA
800	597	NA	NA	NA	NA	NA	NA
900	685	NA	NA	NA	NA	NA	NA
1,000	759	660	NA	NA	NA	NA	NA
1,100	834	729	NA	NA	NA	NA	NA
1,200	917	800	754	NA	NA	NA	NA
1,300	999	878	820	NA	NA	NA	NA
1,400	1,082	954	889	849	NA	NA	NA
1,500	1,164	1,032	965	919	882	NA	NA
1,600	1,245	1,108	1,039	992	951	919	NA
1,700	1,331	1,184	1,112	1,065	1,025	990	867
1,800	1,424	1,272	1,193	1,145	1,103	1,067	937
1,900	1,508	1,352	1,275	1,215	1,174	1,135	1,003
2,000	1,599	1,436	1,358	1,295	1,250	1,210	1,071

B. Adjustment for February-May – Protection of Steelhead Redds

Permittee shall not adjust the MRR for any period between February 1 to May 31 to a value lower than that indicated in Table 2 based on the higher of the MRR for January or February of that year, whether or not that MRR resulted from the application of a Redd Dewatering Protective Adjustment.

Table 2. Redd Dewatering Protective Adjustment for February-May Period

<u>Column 1</u>	<u>Column 2</u>
<i>If the higher of the January MRR or the February MRR was (cfs):</i>	<i>Then the February – May MRR (cfs) shall be no less than:</i>
600	500
700	500
800	520
900	580
1,000	640
1,100	710
1,200	780

1,300	840
1,400	950
1,500	1,030
1,600	1,100
1,700	1,180
1,800	1,250
1,900	1,330
2,000	1,410

In determining the MRR for February, the calculation in Table 2 shall be based solely on the preceding January MRR. If the January or February MRR on which the calculation in Table 2 is based is in between two of the indicated values in Table 2's Column 1, then the applicable MRR under Column 2 shall be interpolated between the nearest indicated values in Column 2.

10. Spring pulse flow

The purpose of this pulse-flow term is to provide a juvenile salmonid emigration cue in below normal and dry years. For purposes of this term, "MRR" means either the MRR based only on the ARI or as adjusted by a Redd Dewatering Protection Adjustment, whichever is greater.

This term applies in a calendar year that: (A) the MRR for March was between 1,000 and 1,500 cfs; and (B) Permittee's actual releases from Nimbus Dam to the lower American River did not equal or exceed the maximum rate of the pulse flow required by this term for at least two consecutive days during the February 1-March 15 period.

In a year in which this term applies, Permittee shall release a pulse flow from Nimbus Dam to the lower American River between March 15 and April 15 pursuant to this term. Permittee shall implement the maximum pulse flow for two days at a flow rate that is three times the MRR that otherwise would apply on those two days, or 4,000 cfs, which is less. Permittee shall ramp its Nimbus releases down from the maximum pulse-flow rate by no more than 500 cfs per day and no more than 100 cfs per hour. The total pulse-flow event shall be no longer than six to seven and one-half days, depending on the length of the necessary ramp-down period. Changes in releases from Nimbus Dam under this term will occur at night when feasible.

In years during which this term applies, the otherwise applicable daily MRR for the April 1-June 30 period shall be reduced evenly by a flow rate equivalent to the total volume of the pulse flow divided by 91 (which is the number of days in the April 1-June 30 period) and then further divided by

1.98 (to convert acre-feet to cfs). The purpose of this adjustment is to ensure that implementation of the pulse flow will not result in a net reduction in Folsom Reservoir storage after June 30 while maintaining a generally consistent MRR from April 1 through June 30.

11. Nimbus Dam release ramping requirements.

Unless otherwise specified in this order, Permittee shall comply with the following requirements in ramping releases from Nimbus Dam to the lower American River:

- A. From January 1 through May 30, at release levels less than 5,000 cfs, reductions in releases will not exceed more than 500 cfs per day and not more than 100 cfs per hour.
- B. Permittee shall minimize the occurrence of Nimbus Dam releases exceeding 4,000 cfs throughout the year, except as may be necessary for flood control or in response to natural high precipitation events.

12. Water temperature management

Permittee shall operate Folsom Dam and Reservoir, and Nimbus Dam, to manage lower American River water temperatures according to Exhibit C. To the extent there is any conflict between Permittee's implementation of Exhibit C and Permittee's compliance with the preceding paragraphs of this order, those preceding paragraphs shall govern.

13. Reclamation Annual Operations Forecast

By January 15 of each year, Permittee shall prepare an Operations Forecast that will guide operations of Folsom Dam and Reservoir and associated facilities anticipated through the following December. Permittee shall update the forecast by the 15th of each later month during the year through December. Each forecast and update to it shall identify the water-year classification based on the ARI (based on the best available information at the time of the forecast) and update will include Permittee's forecasts of the following:

- Monthly inflow to Folsom Reservoir for as many months as reasonably possible
- Monthly average Nimbus Dam releases through December
- End-of-month Folsom Reservoir storages and elevations through December
- The MRR through December

- Anticipated controlling constraints on the operation of Folsom Dam and Reservoir (e.g., Delta water quality, flood control)
- Hydrological data and indices used to determine the flows prescribed by the FMS including but not limited to:
 - Placer County Water Agency (PCWA) forecasted releases from the Middle Fork Project (MFP)
 - Sacramento Metropolitan Utility District (SMUD) forecasted releases from the Upper American River Project (UARP)
 - El Dorado Irrigation District (EID) forecasted releases from Project 184
 - California Nevada River Forecast Center (CNRFC) ensemble forecasts of inflows to Folsom Reservoir
 - DWR B120 forecasts of unimpaired inflow to Folsom Reservoir
- Water-supply deliveries from Folsom Reservoir and Lake Natoma to PCWA, City of Folsom, City of Roseville, San Juan Water District, SMUD, and EID
- Permittee's CVPIA 3406 (b)(2) accounting

Permittee shall include in each forecast and update to it all equations, assumptions and methods used in calculating Nimbus Dam releases and the MRR. Permittee shall submit copies of its forecasts and updates to them to the American River Group and the Deputy Director for Water Rights.

14. Lower American River Group

Permittee shall establish a Lower American River Group (ARG) to make recommendations for management within the constraints of this order's terms. The ARG shall be comprised of representatives of Permittee, the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW) and the Water Forum. Permittee shall facilitate the ARG's meetings, keep a record of the discussions in those meetings, prepare draft summaries of those discussions for review by the other ARG members and make final summaries available to the public promptly upon the ARG's approval of those summaries. Permittee will convene ARG meetings no less often than every six weeks, with five days' notice of each regularly-scheduled meeting to those who request that notice. Regularly-scheduled ARG meetings shall be open to the public. Permittee may convene ARG meetings with less notice if necessary to address urgent conditions and a quorum of at least three ARG members other than the Water Forum. Permittee shall prepare an annual report every February that summarizes the prior calendar year's ARG meetings and describes and evaluates operations affecting the lower American River in that year. Permittee shall seek the assistance of the other

ARG members in preparing each annual report. If the ARG is unable to reach consensus concerning a matter it considers, or the ARG identifies a need for information on a matter from outside of the ARG, then Permittee shall refer the matter to the Water Operations Management Team (WOMT). The WOMT's members are Permittee, NMFS, USFWS, CDFW and the California Department of Water Resources. Permittee will inform the ARG of any resulting operational decision made by the WOMT during the next ARG meeting.

Exhibit A

Procedures for Calculating American River Index

The American River Index (ARI) is determined by the following equation:

ARI = (Bulletin 120 water year 50% exceedance/median runoff forecast for American River below Folsom Lake, in thousands of acre-feet (TAF)) – (Folsom Reservoir water year to date spill, in TAF)).

Where $\sum_{k=Oct\ 1}^{End\ of\ Month\ j-1} (Spill_k (cfs) + ContReg_k (cfs)) \cdot 0.001983 =$ spill_{i,j}

The water-year-to-date_i volume of the Folsom Dam spillway or control regulating discharge (ContReg) for each day_k through the end of month_j as reported by DWR’s California Data Exchange Center website (http://cdec.water.ca.gov/cgi-progs/queryCSV?station_id=FOL); where Spill = spillway discharge (cfs) and ContReg = control regulating discharge (cfs), but only control regulating discharges related to avoiding reservoir spills, not releases used for temperature control in the fall or other discretionary releases

For informational purposes:

The unimpaired inflow used in the ARI is based on the DWR “Bulletin 120, Water Conditions in California” (B120) estimate of unimpaired water year runoff in the “American River below Folsom Lake.” DWR initially publishes the B120 each year in early February, and subsequently publishes updates in March, April, and May on the 6th working day of each month. B120 provides both a forecast of monthly unimpaired flows for the water year (October through September) and a combined water year forecast of unimpaired runoff. DWR’s B120 publications can be found at <http://cdec.water.ca.gov/snow/bulletin120/index.html>. The 50% exceedance value (“Water Year Forecast”) is used in computing the ARI.

The amount of spill water in the ARI computation is the cumulative water-year-to-date (WYTD) amount of discharge from the Folsom Dam Spillway and the Control Regulating Gates as reported by DWR’s California Data Exchange Center (CDEC) website (http://cdec.water.ca.gov/cgi-progs/queryCSV?station_id=FOL). However, only Control Regulating Gate discharges related to avoiding reservoir spills are used in the calculation, not releases used for temperature control in the fall (or other discretionary releases). The WYTD discharge is calculated from October 1 through the end of the month preceding the forecast (e.g., October 1 through January 31 for the February forecast).

Exhibit B

Formulae for Determining Minimum Release Rates

All values of the Minimum Release Rate calculated under this exhibit are in cubic feet per second (cfs).

1. January MRR – based on Sacramento River Index

The MRR for January shall be determined by the following formula based on the Sacramento River Index (SRI):

If $SRI \leq 5,500$ TAF, then $MRR = 500$
If $5,500 \text{ TAF} < SRI \leq 7,800$ TAF, then $MRR = 0.1304 * SRI - 217$
If $7,800 \text{ TAF} < SRI \leq 11,500$ TAF, then $MRR = 0.2568 * SRI - 1,203$
If $SRI > 11,500$ TAF, then $MRR = 1,750$

2. February 1-March 31 MRR – based on American River Index (ARI)

The MRR for February 1 through March 31 shall be determined by the following formula based on the American River Index (ARI):

If $ARI \leq 800$ TAF, then $MRR = 500$
If $800 \text{ TAF} < ARI \leq 1,000$ TAF, then $MRR = 1.500 * ARI - 700$
If $1,000 \text{ TAF} < ARI \leq 1,958$ TAF, then $MRR = 0.9918 * ARI - 192$
If $ARI > 1,958$ TAF, then $MRR = 1,750$

3. April 1-June 30 MRR – based on ARI

The MRR for April 1 through June 30 shall be determined by the following formula based on the ARI:

If $ARI \leq 800$ TAF, then $MRR = 500$
If $800 \text{ TAF} < ARI \leq 1,000$ TAF, then $MRR = 1.500 * ARI - 700$
If $1,000 \text{ TAF} < ARI \leq 2,210$ TAF, then $MRR = 0.579 * ARI + 221$
If $ARI > 2,210$ TAF, then $MRR = 1,500$

4. July 1-September 30 MRR – based on ARI

The MRR for July 1 through September 30 shall be determined by the following formula based on the ARI:

If $ARI \leq 800$ TAF, then $MRR = 500$

If $800 \text{ TAF} < \text{ARI} \leq 900 \text{ TAF}$, then $\text{MRR} = 3.000 * \text{ARI} - 1,900$
If $900 \text{ TAF} < \text{ARI} \leq 1,200 \text{ TAF}$, then $\text{MRR} = 2.333 * \text{ARI} - 1,300$
If $1,200 \text{ TAF} < \text{ARI} \leq 1,958 \text{ TAF}$, then $\text{MRR} = 0.330 * \text{ARI} + 1,104$
If $\text{ARI} > 1,958 \text{ TAF}$, then $\text{MRR} = 1,750$

5. October 1-October 30 MRR – based on ARI

The MRR for October 1 through October 30 shall be determined by the following formula based on the ARI:

If $\text{ARI} \leq 800 \text{ TAF}$, then $\text{MRR} = 500$
If $800 \text{ TAF} < \text{ARI} \leq 1,000 \text{ TAF}$, then $\text{MRR} = 1.500 * \text{ARI} - 700$
If $1,000 \text{ TAF} < \text{ARI} \leq 1,706 \text{ TAF}$, then $\text{MRR} = 0.9913 * \text{ARI} - 191$
If $\text{ARI} > 1,705 \text{ TAF}$, then $\text{MRR} = 1,500$

6. November 1-December 31 MRR – based on ARI

The MRR for November 1 through December 31 shall be determined by the following formula based on the ARI:

If $\text{ARI} \leq 800 \text{ TAF}$, then $\text{MRR} = 500$
If $800 \text{ TAF} < \text{ARI} \leq 1,000 \text{ TAF}$, then $\text{MRR} = 1.500 * \text{ARI} - 700$
If $1,000 \text{ TAF} < \text{ARI} \leq 2,210 \text{ TAF}$, then $\text{MRR} = 0.9913 * \text{ARI} - 191$
If $\text{ARI} > 2,210 \text{ TAF}$, then $\text{MRR} = 2,000.$

Exhibit C

Lower American River Water Temperature Management

Permittee will prepare an Annual Water Temperature Management Plan for submission to the National Marine Fisheries Service (NMFS) for review by May 1 of each year. Within ten calendar days of receiving the draft Annual Water Temperature Management Plan, to the maximum extent possible, Permittee will obtain from NMFS a written review of the plan. Permittee will produce a final plan prior to May 15, and implement the plan immediately upon finalization. Permittee will provide the SWRCB's Deputy Director for Water Rights copies of the May 15 Final Annual Water Temperature Management Plan.

1. Annual Water Temperature Management Plan

Permittee's Annual Water Temperature Management Plan will be prepared in accordance with the Water Temperature Objectives described below, and will be based on Permittee's most recent monthly Operations Forecast available at the time of plan development. The Annual Water Temperature Management Plan will be designed to minimize water temperature-related effects on Central Valley steelhead and provide for Chinook salmon spawning in the fall in the lower American River.

The following Water Temperature Objectives are to be incorporated with the streamflow and reservoir storage provisions of the attached order.

2. Water Temperature Objectives

Water temperature objectives in this exhibit are to be achieved to the extent physically controllable, which includes the bypass of water in lieu of its use for power generation¹, and the implementation of any future water temperature-related infrastructure improvements. Permittee will manage the Folsom Reservoir coldwater pool, the Folsom Dam and Reservoir/Nimbus Dam complex, and the water temperature control shutters at Folsom Dam in an effort to maintain a daily average water temperature (calculated using the average of the hourly readings) at Watt Avenue Bridge:

- 65°F or less from May 15 through September 30 to provide suitable conditions for juvenile steelhead rearing in the lower American River.

¹ Power generation bypass through use of the lower outlets at Folsom Dam will be employed if water temperature modeling indicates that water temperatures of 58°F or less at Watt Avenue Bridge cannot be achieved by November 15 and sustained through December each year. This requirement does not preclude Permittee from power generation bypass under different conditions to benefit fall-run Chinook salmon spawning and incubation.

- 60°F or less by October 15 to provide suitable conditions for fall-run Chinook salmon holding and early spawning.
- 56°F or less by November 1 to provide suitable conditions for fall-run Chinook salmon spawning and embryo incubation.

2.1. Water Temperature Objectives Exceptions

When preparing the Annual Water Temperature Management Plan, Permittee may submit to NMFS a written determination that, after taking all actions within its authorities, it is unlikely to meet the Water Temperature Objectives stated in this exhibit. This determination must be supported by specific iterative modeling techniques that vary allocations and delivery schedules as specified in the NMFS 2009 OCAP BO, as amended (or functionally equivalent document). In the event that Permittee determines that other nondiscretionary requirements (e.g., D-1641 or requirements of the USFWS 2008 OCAP BO) conflict with attainment of the Water Temperature Objectives, Permittee will convene the Lower American River Group (ARG) to obtain recommendations. If consensus cannot be achieved within the ARG, the ARG will advise NMFS, and NMFS will make a recommendation to the WOMT, per standard operating procedures.). The WOMT's members are Permittee, NMFS, the U.S. Fish and Wildlife Service, the California Department of Fish and Wildlife and the California Department of Water Resources.

2.2. Water Temperature Modeling and Plan Development

Permittee will be responsible for the set of data needed to model the use of Folsom Reservoir's cold-water pool. Permittee will conduct model studies to evaluate the ability to achieve an incrementally-adjusted series of downstream water temperature targets in the lower American River, in consideration of cold-water availability in Folsom Reservoir. These water temperature model studies will incorporate the necessary input data (e.g., Operations Forecast, reservoir temperature profile, shutter operation assumptions, and targeted lower American River water temperatures). Results of the water temperature model studies will demonstrate resultant downstream water temperatures during the late spring and summer months (May 15 through September 30), while conserving a volume of cold-water in Folsom Reservoir for use during the fall-run Chinook salmon spawning period (October 15 through December 31).

Permittee will be responsible to perform the water temperature modeling prior to submittal of the draft Annual Water Temperature Management Plan to NMFS by May 1 each year. Modeling will be conducted using the iterative Coldwater Pool Management Model (iCPMM), CE QUAL W2, or equivalent model in the development of the Annual Water Temperature Management Plan. The objective of the modeling will be to select the most beneficial seasonal water temperature

regime for the lower American River during a given year. Selection of the seasonal water temperature regime is characterized by the rate and duration with which available cold water will be released from Folsom Reservoir to manage water temperatures downstream in the lower American River. Water temperature modeling requires:

- Initial reservoir conditions (e.g., water temperature profiles)
- Hydrologic time series data of projected inflows to Folsom Reservoir
- Reservoir evaporation and river heat gain
- Meteorological data
- Folsom Reservoir operational data (releases and diversions)

2.3. Iterative Water Temperature Modeling Process

The Annual Water Temperature Management Plan is to identify the most beneficial water temperature regime possible from May 15 through November, constrained by cold-water pool availability in Folsom Reservoir and the Modified FMS flow and storage provisions.

The Folsom Reservoir and lower American River water temperature models are utilized in an iterative manner referred to as the Automated Temperature Selection Procedure (ATSP). The ATSP operates the reservoir and river water temperature models with the objective of achieving monthly target water temperatures in the lower American River at Watt Avenue.

The ATSP involves the use of multiple target water temperature schedules for the lower American River at Watt Avenue. The “schedule” approach was developed with the purpose of balancing the seasonal use of Folsom Reservoir’s cold-water availability, which varies from year-to-year. The prioritization order of the target temperature schedules reflects the desire to protect juvenile steelhead over-summer rearing, while considering the needs of fall-run Chinook salmon spawning, given the constraints of cold-water pool availability in Folsom Reservoir.

A schedule of water temperatures, for May through November, is specified as the preferred schedule of monthly water temperature targets. Because Folsom Reservoir water temperatures are not isothermal during the May through November period, ATSP water temperature targets are achieved through choice of reservoir level from which releases are drawn. If the preferred schedule cannot be achieved with the available release level choices, the procedure cycles to a second, slightly less preferred schedule of water temperatures. If the second schedule cannot be met, the procedure continues stepwise through the series of schedules,

arranged by declining preference, until a schedule of targets can be met for that year.

Table C-1 presents the ATSP schedules, with Schedule #1 representing the most beneficial application of cold-water pool availability for Folsom Reservoir releases during the May through November period. Schedule #78 represents the least desirable application, but may be the only achievable schedule during years of extremely limited cold-water pool availability in Folsom Reservoir. In Table C-1, the highlighted cells indicate changes in water temperature targets for a given month and schedule, as compared to the previous schedule.

Table C-1. Automated Temperature Selection Procedure schedules.

Schedule	Lower American River Water Temperature Targets at Watt Avenue (°F)						
	May	Jun	Jul	Aug	Sep	Oct	Nov
1	63	63	63	63	63	56	56
2	63	63	63	63	63	57	56
3	63	63	63	63	63	58	56
4	63	63	63	63	63	59	56
5	63	63	63	63	63	60	56
6	63	63	63	63	63	60	57
7	63	63	63	63	63	60	58
8	63	63	64	63	63	60	58
9	63	63	64	64	63	60	58
10	63	63	64	64	64	60	58
11	63	64	64	64	64	60	58
12	64	64	64	64	64	60	58
13	64	64	65	64	64	60	58
14	64	64	65	65	64	60	58
15	64	64	65	65	65	60	58
16	64	65	65	65	65	60	58
17	65	65	65	65	65	60	58
18	65	65	65	65	65	61	58
19	65	65	65	65	65	62	58
20	65	65	65	65	65	63	58
21	65	65	65	65	65	64	58
22	65	65	65	65	65	65	58
23	65	65	65	65	65	65	59
24	65	65	66	65	65	65	59
25	65	65	66	66	65	65	59
26	65	65	66	66	66	65	59
27	65	66	66	66	66	65	59
28	66	66	66	66	66	65	59
29	66	66	67	66	66	65	59

30	66	66	67	67	66	65	59
31	66	66	67	67	67	65	59
32	66	67	67	67	67	65	59
33	67	67	67	67	67	65	59
34	67	67	68	67	67	65	59
35	67	67	68	68	67	65	59
36	67	67	68	68	68	65	59
37	67	68	68	68	68	65	59
38	68	68	68	68	68	65	59
39	68	68	68	68	68	66	59
40	68	68	68	68	68	67	59
41	68	68	68	68	68	68	59
42	68	68	69	68	68	68	59
43	68	68	69	69	68	68	59
44	68	68	69	69	69	68	59
45	68	69	69	69	69	68	59
46	69	69	69	69	69	68	59
47	69	69	69	69	69	69	59
48	69	69	69	69	69	69	60
49	69	69	70	69	69	69	60
50	69	69	70	70	69	69	60
51	69	69	70	70	70	69	60
52	69	70	70	70	70	69	60
53	70	70	70	70	70	69	60
54	70	70	70	70	70	70	60
55	70	70	70	70	70	70	61
56	70	70	71	70	70	70	61
57	70	70	71	71	70	70	61
58	70	70	71	71	71	70	61
59	70	71	71	71	71	70	61
60	71	71	71	71	71	70	61
61	71	71	71	71	71	71	61
62	71	71	71	71	71	71	62
63	71	71	72	71	71	71	62
64	71	71	72	72	71	71	62
65	71	71	72	72	72	71	62
66	71	72	72	72	72	71	62
67	72	72	72	72	72	71	62
68	72	72	72	72	72	72	62
69	72	72	72	72	72	72	63
70	72	72	72	72	72	72	64
71	72	72	72	72	72	72	65
72	72	72	72	72	72	72	66
73	72	72	72	72	72	72	67

74	72	72	72	72	72	72	68
75	72	72	72	72	72	72	69
76	72	72	72	72	72	72	70
77	72	72	72	72	72	72	71
78	72	72	72	72	72	72	72

There are no water temperature targets for the months of December through April. During these months of the year, Folsom Reservoir is typically well-mixed and the water column is nearly isothermal with depth. For this reason and because ambient air temperatures are sufficient to maintain suitable water temperatures for steelhead and fall-run Chinook salmon in the lower American River, water temperature targets are not identified for the December through April period.

Once the most beneficial water temperature regime is identified, then it will be incorporated in the Annual Water Temperature Management Plan.

2.4. September Water Temperature Plan Update

Permittee will prepare a September Water Temperature Plan Update (September Update) for submission to NMFS for review by September 15 of each year. Within ten calendar days of receiving the September Update, to the maximum extent possible, Permittee will obtain from NMFS a written review of the plan. Permittee will produce a final plan prior to October 1, and implement the plan immediately upon finalization. Permittee will provide the SWRCB's Deputy Director for Water Rights copies of the Final September Update.

The purpose of the September Update is to reduce the uncertainty inherent in projecting specific water temperature targets during the fall (i.e., October and November). To develop the September Update, Permittee will re-run the water temperature modeling with updated conditions (e.g., Folsom Reservoir storage and cold-water pool volume) to identify the most beneficial water temperature regime that can be achieved for fall-run Chinook salmon and incubation from October 15 through November. This updated modeling assessment will be conducted using a weekly ATSP specifically for that time period.

2.5. Other Considerations

As discussed above in this exhibit, actual conditions can differ from the forecasted conditions as the water year progresses. If the monthly updated Annual Operations Plan demonstrates that water temperatures in the lower American River identified in the May 15 Final Annual Water Temperature Management Plan will not be able to be met, then the need for modifications or changes to the Annual Water

Temperature Management Plan will be resolved through consultation with NMFS and the ARG process.

If the monthly water temperatures specified in the Annual Water Temperature Management Plan at Watt Avenue are exceeded for three consecutive days or are exceeded by more than 3°F for a single day, Permittee will notify NMFS in writing and convene the ARG to obtain input and recommendations regarding potential coldwater pool management alternatives to improve water temperature conditions for the fisheries.